

AN UNDESCRIBED SPECIES OF *LESQUERELLA*  
(CRUCIFERAE) FROM THE STATE OF WASHINGTON

REED C. ROLLINS, KATHRYN A. BECK, AND  
FLORENCE E. CAPLOW

ABSTRACT

Recent books covering the flora of Washington admit only one species of *Lesquerella*, *L. douglasii* S. Watson, to the flora of the state. A different, undescribed species of this genus has been recognized from recent collections. The new species was first collected in 1883 but the specimens from that gathering are incomplete and they were never appropriately utilized. The new species is named *L. tuplashensis* and it is compared with *L. douglasii*, its nearest relative.

Key Words: Hanford Nuclear Reservation, *Lesquerella tuplashensis*, *L. douglasii*, White Bluffs

INTRODUCTION

During the course of a survey of plants within the Hanford Nuclear Reservation in south-central Washington, an unexpected species of *Lesquerella* was found on the White Bluffs adjacent to the Hanford Reach of the Columbia River. The restricted habitat of this species is extremely dry and supports only a sparse vegetation. That the species is unique was determined by comparing it in detail with potentially related species of *Lesquerella* including the only other species known from the area, *L. douglasii* S. Watson, which occurs from northern Oregon to British Columbia (Rollins and Shaw, 1973). A recent taxonomic review of *Lesquerella* by one of us (Rollins, 1993) following on a monographic treatment of the genus (Rollins and Shaw, 1973) has provided a sound basis for interpreting the new material. All other known species of *Lesquerella* were considered as candidates for the unknown but were ruled out because they were distinctly different. As it turns out, this is not the first time the unknown species had been collected.

In 1883 T. S. Brandegee and Frank Tweedy, working as botanists for the Northern Transcontinental Survey (Rose, 1904), collected the species we here name *Lesquerella tuplashensis*. The Brandegee collection, his no. 635, bears the data, "White Bluffs of the Columbia, Washington Terr., July 1883," and is represented by specimens at GH, NY, and UC. We have seen only



fragments of the Tweedy collection, no. 8, at GH, from the same locality, June, 1883. Unfortunately, this early material was not sufficiently complete, and to some extent anomalous, to be accurately identified. The Brandege specimen in the Gray Herbarium has been successively named *Vesicaria montana* Gray?, *V. occidentalis* Watson?, and *V. douglasii*, the latter annotation by C. V. Piper. The generic name *Vesicaria* was used before *Lesquerella* was established. The notation on the label, *Vesicaria occidentalis*, is in Watson's handwriting and has the specific name *kingii* below it crossed out. The original identifier of the specimen and Watson were obviously uncertain about the identity of the material. Piper's annotation is unequivocal and it should be noted that he accepted (Piper, 1906) only one species of *Lesquerella* from the Columbia River area. He commented that the Brandege specimens were erroneously associated with *L. occidentalis* in the Synoptical Flora (Gray, Watson, and Robinson, 1895). There Watson, who authored the treatment of *Lesquerella*, did indeed associate the Brandege collection with *L. occidentalis*, but he also wrote, "taller specimens from the White Bluffs of the Columbia, Washington (*Brandegee*), have broadly obovate obtuse fruit and may be distinct." There is no mention of this specimen in Watson's earlier treatment (1885, 1888) of *Lesquerella*. Evidently Payson, in preparing his monograph of *Lesquerella* (1922) did not see the Brandege or Tweedy material, or at least he did not mention them.

In more recent treatments of *Lesquerella* (Payson, 1922; Rollins and Shaw, 1973; Rollins, 1993) only one species, *L. douglasii*, is attributed to the state of Washington. A rather lengthy discussion, concerning specimens from Washington previously referred to other species, is given by Rollins and Shaw (1973) under the name *L. occidentalis*. One of the main points made there is that, although the Brandege specimen was cited by Watson in his original presentation of *L. occidentalis* as a new species, and is therefore a syntype, the specimen is not of that species as it is presently understood. This discussion should be consulted by anyone seriously interested in the problem.

In our judgment, there is no doubt that *Lesquerella tuplashensis* is related to *L. douglasii* and it is our assumption that it was derived evolutionally from that species. Because of the silique shape, ovule number, and trichome type, *L. tuplashensis* is referable to group 8 (Rollins and Shaw, 1973). Of the eleven species



included there, *L. tuplashensis* is most similar to *L. douglasii*. It is perhaps significant that *L. tuplashensis* is restricted in distribution to a specialized habitat and has few plant associates, several of limited distribution, whereas *L. douglasii* has a much broader geographic range and occurs in a variety of habitats with a much wider range of associated species. The interpretation that *L. tuplashensis* is a derived species fits the general situation in *Lesquerella* (Rollins and Shaw, 1973; Rollins, 1993) where there are numerous examples of a similar relationship between widespread species of diverse habitats and apparently derived taxa of limited distribution adapted to restricted, usually highly calcareous, sites. The rigorous edaphic factors there exerting unusual selection pressure on plants able to cope with such sites may have contributed to their having evolved into distinct taxa. But it must be admitted that evolution could have proceeded either way, from widespread to restricted species or from restricted to widespread species.

***Lesquerella tuplashensis* Rollins, Beck & Caplow, *sp. nov.***

TYPE: U.S.A. Washington, Franklin County: White Bluffs, T13N, R27E, S11, W $\frac{1}{2}$ , above the Columbia River, caliche soil at edge of eroding bluff, 20 July 1994, *K. Beck & F. Caplow 94001* (Holotype: GH; Isotype: WTU). Associated species: *Artemisia tridentata* Nutt., *Astragalus caricinus* (Jones) Barneby, *Cryptantha spiculifera* (Piper) Payson, *Eriogonum microthecum* Nutt., and *Poa sandbergii* Vasey.

Herba perennis multicaulis, caudicibus simplicibus crassiusculis, caulibus erectis vel prope decumbentibus 1–2 dm altis, foliis basalibus petiolatis integris vel sparse lobatis dense pubescentibus argenteis (1.5)2–4(–6) cm longis, foliis caulinis imbricatis, sepalis oblongis 3–4 mm longis, petalis luteis anguste lingulatis 4.5–5 mm longis, pedicellis fructiferis late divaricatis rectis 9–11(–13) mm longis, siliquis subglobosis vel fere obovatis 3–4 mm longis, stylis 2.5–3 mm longis, loculis (2–)3–4 ovulatis, seminibus suborbicularibus ca. 2 mm diametro, cotyledonibus accumbentibus.

Perennial, caudex simple, to 1 cm thick; stems mostly arising below the leaf rosette, several to numerous, slightly decumbent to erect, densely pubescent, 1–2(–3.5) dm tall; basal leaves rosulate, densely pubescent, silvery, (1.5)2–4(–6) cm long, rounded to broadly obtuse at apex, (0.5–)1–1.5(–2.5) cm wide, outer leaves



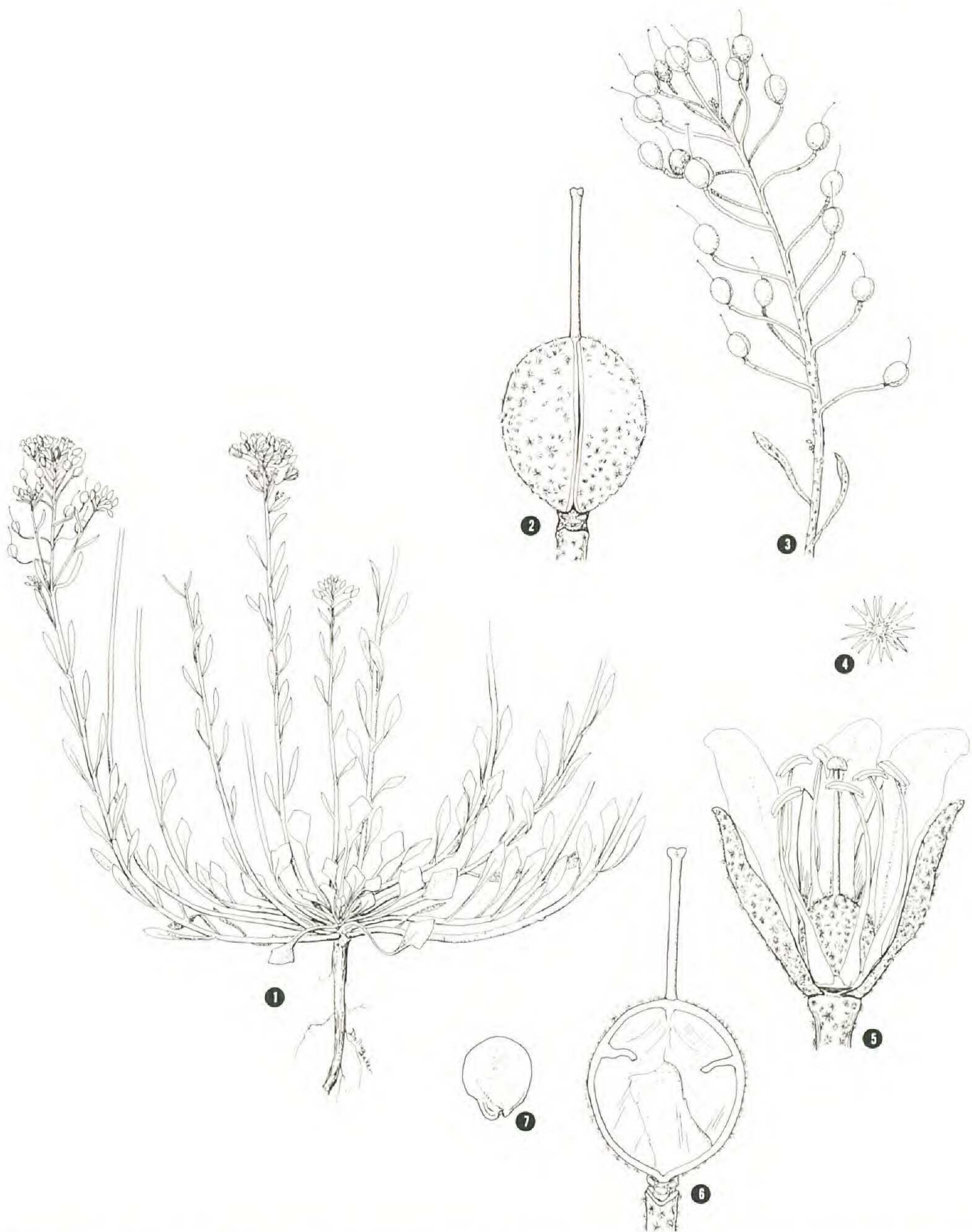


Figure 1–7. *Lesquerella tuplashensis*. Magnifications are approximate. Figure 1, habit  $\times \frac{1}{3}$ ; figure 2, silique  $\times 7$ ; figure 3, infructescence  $\times \frac{2}{3}$ ; figure 4, trichome  $\times 12$ ; figure 5, flower  $\times 7$ ; figure 6, replum  $\times 7$ ; figure 7, seed  $\times 7$ .

usually entire with nearly orbicular blades and slender petioles, inner similar but usually few-lobed or sometimes entire; cauline leaves densely overlapping, obovate to spatulate, sometimes narrower, obtuse to more nearly rounded at apex, petiolate except the uppermost, 1–1.5 cm long, 4–8 mm wide; leaf trichomes dense and silvery occurring in several layers over the entire surface,



radiate, appressed, rays mostly forked, fused toward base, ray tips 15–18; inflorescences usually dense, 3–6 cm long; sepals ascending to erect, narrowly oblong, densely pubescent on the exterior, 3–4 mm long; petals yellow, narrowly oblanceolate to spatulate, not unguiculate, 4.5–5 mm long; fruiting pedicels densely pubescent, widely spreading to slightly ascending, straight or nearly so, 9–11(–13) mm long; siliques slightly obovoid to subglobose, turgid, substipitate, 3–4.5 mm long, densely pubescent on exterior, glabrous on interior, silique trichomes mostly stipitate, not appressed; styles 2.5–3 mm long; ovules 2–3(–4) per locule; septum entire or rarely slightly perforate; seeds orbicular to broadly oblong, compressed, ca. 2 mm long, immarginate, radical equaling cotyledons; cotyledons accumbent.

ADDITIONAL SPECIMENS EXAMINED: U.S.A., Washington, Franklin County: White Bluffs, above the Columbia River, T13N, R27E, S11, W $\frac{1}{2}$ , edge of eroding bluff in shallow caliche soil, 18 Aug. 1994, *Beck & Caplow 94002* (GH, WTU); same general locality, July, 1883, *T. S. Brandegee 635* (GH, NY, UC); same locality, June, 1883, *F. Tweedy 866* (GH); T13N, R28E, S33, NW  $\frac{1}{4}$  of NW  $\frac{1}{4}$  in hard calcium carbonate “caliche” with *Poa sandbergii* Vasey, *Cryptantha spiculifera* (Piper) Payson, *Eriogonum microthecum* Nutt., and *Eurotia lanata* (Pursh) Moq., June 1, 1995, *Beck & Caplow 95085* (GH); T13N, R27E, S24, NE  $\frac{1}{4}$  of NE  $\frac{1}{4}$ , May 19, 1995, *Beck & Caplow 95053* (GH); T12N, R28E, S11, NW  $\frac{1}{4}$  of SW  $\frac{1}{4}$ , June 1, 1995, *Beck & Caplow* (GH).

The name “tuplashensis” refers to the White Bluffs of the Columbia River where the species occurs. “Tuplash” is a place name for the White Bluffs in the Sahaptin language, the language of the Wanapum Tribe and other tribes whose traditional territories include the White Bluffs. “Plash” refers to the distinctive white color of the bluffs (Relander, 1956).

In comparing *Lesquerella tuplashensis* with its related *L. douglasii*, we find that most features are similar. Basically the cauline leaves of *L. tuplashensis* are imbricated and there is a range from linear to petiolate with a broad rounded blade, while those of *L. douglasii* are loosely arranged and narrowly linear. The basal leaves, especially those of the outer margin, of *L. tuplashensis* are more rounded and broader than those of *L. douglasii*. The most noticeable distinction between the two species is in the trichomes of the siliques. Trichomes on the exterior surfaces of the silique



valves of *L. tuplashensis* have the radiate portion raised on a stipe-like stalk whereas the comparable trichomes of *L. douglasii* are sessile and the radiate portion is appressed to the valve surface. In general habit, the plants of *L. tuplashensis* are more compact and denser than those of *L. douglasii*.

*Lesquerella tuplashensis* grows on the upper edge and upper face of the White Bluffs adjacent to the Columbia River. The only known population is found on the upper zone and top of a near vertical exposure of cemented, highly alkaline calcium carbonate paleosol (a "caliche" soil). Nearby Soil Conservation Service soil samples of a buried horizon of the same calcium carbonate layer contained 79% calcium carbonate and had a pH of 8.4 (Soil Conservation Service, unpubl.). This hard calcium carbonate paleosol caps several hundred feet of alkaline, easily eroded, lacustrine sediments of the Ringold Formation (Newcomb, 1958). The average annual precipitation for the area is 12 cm (Rickard et al., 1988).

The population is approximately two to seven m wide and extends for 17 km along the upper edge of the bluffs. The holotype was collected from the northern end of the population. Although there are scattered small exposures of similar caliche substrate in coulees to the north of the White Bluffs, these areas were examined and the species was not present. The White Bluffs population may be the only one of the species.

The vegetational cover of the bluffs is extremely sparse but includes, in addition to *Lesquerella tuplashensis*, a number of plant species that are rare in Washington: *Cryptantha spiculifera* (Piper) Payson, *Astragalus geyeri* Gray, *Cuscuta denticulata* Engelm., and *Camissonia pygmaea* (Dougl.) Raven.

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R.C.R.

GRAY HERBARIUM OF HARVARD UNIVERSITY

22 DIVINITY AVE.,

CAMBRIDGE, MA 02138

K.A.B. & F.E.C.

CALYPSO CONSULTING

1130 21ST ST.

BELLINGHAM, WA 98225